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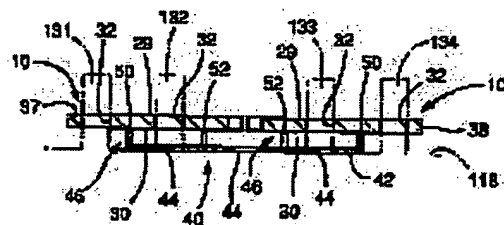
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(54) CONNECTING METHOD FOR TAPE, CONNECTING MEMBER AND CONNECTING TOOL

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a connecting method that connects strongly the ends of component support tapes, the connecting member and the connecting tool.

SOLUTION: Positioning projections 132, 133 projected on a pressing face 188 of a tape connection tool are inserted to each feed hole 44 at both ends of a tape-connecting member 40, and positioning projections 131-134 or the like are inserted to each feed hole 32 at an end 37 and a start 38 of a component support tape 10 to conduct relative positioning between each end of the tape connecting member 40 and each end of the component support tape 10. The component support tape 10 is penetrated by a calking claw of the tape connecting member 40 in the broadwise direction by the operation of the tape connecting tool to closely contact a main body 42 of the tape connecting member 40 with a rear side 30 of the component support tape 10, and the end 37 and the start 38 of the component support tape 10 are connected by caulking the projection of the calking claw 46.



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CLAIMS

[Claim(s)]

[Claim 1] Along with two straight lines prolonged in a longitudinal direction, many components hold crevices and feed holes are formed at constant pitch, respectively. It is the approach of connecting the edges of a components maintenance tape which hold one electrical part at a time in a components hold crevice. The tape connection member to which made two or more leave the tabular body section in which two or more feed holes were formed in the pitch equal to the feed hole of said components maintenance tape, and the pawl was made to project at a right angle by the body section is used. Two components maintenance tapes which should be connected every at least one of two or more feed holes of the tape connection member each in the condition of having made it in agreement with the feed hole of an edge While making two or more go away, making every at least one of a pawl penetrate each components maintenance tape in the thickness direction and sticking said body section on the whole surface of a components maintenance tape The tape connection approach which connects the edges of a components maintenance tape by making the field of the opposite side leave and closing the lobe of a pawl.

[Claim 2] The tape connection member to which made two or more go away and the pawl was made to project at a right angle from the tabular body section formed in pitches [feed holes / two or more] by the body section.

[Claim 3] The press plate of the pair which counters mutually in a press side, and the press device which holds in the condition that it approaches and the press plates of these pairs may be made to estrange, and presses the press side of a pair to both sides of a tape in the approach condition of these press plate, A tape connection tool including the crevice in which it is formed in the part which counters two or more locating lug which protruded on one press side of the press plate of said pair together with the single tier, and said locating lug of the press side of another side of the press plate of said pair, and a locating lug is held at the time of approach of the press plate of a pair.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the approach of connecting the edges of a components maintenance tape, the connection member used for operation of the approach, and a connection tool.

[0002]

[Description of the Prior Art] Along with two straight lines to which a components maintenance tape extends in a longitudinal direction, many components hold crevices and feed holes are formed at constant pitch, respectively, and it holds one electrical part at a time in a components hold crevice. Carrying out sequential supply is widely performed [electrical part / one / formation pitch / every / delivery of a components hold crevice, and each part article hold crevice to] at a time in this components maintenance tape. In this case, although a components maintenance tape is wound around a reel, or is held in a hold container, it is pulled out from a leader and it is sent according to a delivery device, if it becomes near the trailer, the leader of a new components maintenance tape is connected with that trailer, and supplying an electrical part from a new components maintenance tape following a front components maintenance tape is performed.

[0003] Adhesive tape and a tape connection chip are used for the above-mentioned connection. By being stuck on the front face of the carrier tape on which the bottom tape was stuck on the rear face of the tape made of pasteboard which has the through tube of a large number which the components maintenance tape penetrated in the thickness direction, and its carrier tape, in upward opening of a through tube, when it is a paper tape containing a wrap top tape, both a carrier tape and a top tape are connected with adhesive tape in many cases. By being stuck on the front face of the carrier tape on which the components maintenance tape was formed in the tape made of synthetic resin, and much embossing was formed in the longitudinal direction to it, and its carrier tape, in opening of embossing, when it was an embossing tape containing a wrap top tape, the carrier tape might be connected by the cemented carbide tip, and the top tape might be connected with adhesive tape. The communicating pore by which weld flash was formed of burring between each feed hole in the periphery is formed, and when weld flash eats on a carrier tape and is ****(ed), a cemented carbide tip achieves a connection function, while a feed hole is formed in the metal plate which constitutes a longitudinal configuration in the feed hole and this pitch of a components maintenance tape.

[0004] However, when front flesh-side both sides were connected with adhesive tape, connection reinforcement and the connected pitch accuracy of the feed hole of both ends are non-help victories, and there was a problem that the dependability of connection was inadequate. When using the cemented carbide tip by which burring was carried out, although dependability improved to some extent in the embossing tape, a paper tape is inadequate and there was a problem with which practical use cannot be presented. It is difficult to make it thin, in order for the body section of a cemented carbide tip to make a curve possible with a components maintenance tape, and to make the weld flash of sufficient height project from a thin metal plate, and is because sufficient connection reinforcement is not obtained even if it makes low weld flash eat into the carrier tape made of paper.

[0005]

[Object of the Invention, a technical-problem solution means, an operation, and effectiveness]
 dependability this invention makes the above situation a background and sufficient also with a paper tape also on an embossing tape -- with -- according to [make enabling it to connect as a technical problem, and] this invention -- each following voice -- the tape connection approach [like], a tape connection member, and a tape connection tool are obtained. Each mode is divided into a term like a claim, gives a number to each item, and indicates it in the format of quoting the number of other terms if needed. It is because the possibility of the combination of the component of each mode is specified.

(1) Along with two straight lines prolonged in a longitudinal direction, many components hold crevices and feed holes are formed at constant pitch, respectively. It is the approach of connecting the edges of a components maintenance tape which hold one electrical part at a time in a components hold crevice. The tape connection member to which made two or more leave the tabular body section in which two or more feed holes were formed in the pitch equal to the feed hole of said components maintenance tape, and the pawl was made to project at a right angle by the body section is used. Two components maintenance tapes which should be connected every at least one of two or more feed holes of the tape connection member each in the condition of having made it in agreement with the feed hole of an edge While making two or more go away, making every at least one of a pawl penetrate each components maintenance tape in the thickness direction and sticking said body section on the whole surface of a components maintenance tape The tape connection approach which connects the edges of a components maintenance tape by making the field of the opposite side leave and closing the lobe of a pawl (claim 1). thus -- if the edges of a components maintenance tape are connected by making the field of the opposite side leave and closing the lobe of a pawl while making the caulking pawl of a tape connection member penetrate a components maintenance tape and sticking the body section of a tape connection member to one field of a components maintenance tape, even if it will be a paper tape as well as an embossing tape -- sufficiently high dependability -- with, it can connect. By being able to form in sufficient height, making it project to the opposite side of a components maintenance tape, and closing a protrusion edge, even if a caulking pawl is a paper tape, it can be connected by sufficient reinforcement.

(2) Said feed hole brings near by one side of the cross direction of the components maintenance tape, and is formed in said components maintenance tape, and the width of face of said tape connection member is 2 double less or equal of the distance from the core of the feed hole of a components maintenance tape to the side edge of a near side. The tape connection approach given in (1) term. Even if it can make small width of face of the body section of a connection member and makes the body section comparatively thick, it can be made to curve with a components maintenance tape, if it does in this way. If the body section can be thickened, when starting the part and forming a caulking pawl, sufficient reinforcement for a caulking pawl can be given.

(3) The tape connection member to which made two or more go away and the pawl was made to project at a right angle from the tabular body section formed in pitches [feed holes / two or more] by the body section (claim 2). If the tape connection member of this gestalt is used, said tape connection approach can be enforced.

(4) Said tape connection member was formed by the metal plate, and said caulking pawl was formed when a part of the metal plate was raised by the right angle. Tape connection member given in (3) terms. The tape connection member of this gestalt can be manufactured cheaply easily.

(5) two or more said caulking pawls were formed every together with the cross direction of a tape connection member (3) -- or -- Tape connection member of any one publication of the (4) terms. If two or more caulking pawls are formed every together with the cross direction of a tape connection member, width of face will become possible [obtaining sufficient connection reinforcement] with the caulking pawl on which it can close whether it is narrow and easy. Moreover, it becomes possible to shorten the die length of a tape connection member as compared with the case where the caulking pawl of the same number is put in order and formed in the longitudinal direction of a tape connection member.

(6) said -- the upper limit section is divided into two forks, and at least one transverse-plane configuration of the caulking pawl of a book accomplishes two or more about Y typefaces (3) -- or --

Tape connection member of any one publication of the (5) terms. If the part divided into the two forks of the caulking pawl of this configuration is crushed in respect of even press, it will be crushed in the direction in which the part divided into two forks contains the component of the direction pushed further open, the extract of a caulking pawl will be prevented good, and the effectiveness that connection reinforcement improves will be acquired.

(7) said -- the upper limit section curves crosswise [of the caulking pawl], and at least one transverse-plane configuration of the caulking pawl of a book accomplishes two or more about J typefaces (3) -- or -- Tape connection member of any one publication of the (6) terms. If the part which curved crosswise [of the caulking pawl of this configuration] is crushed in respect of even press, it will be crushed in the direction in which the curved part contains a crosswise component, the extract of a caulking pawl will be prevented good, and the effectiveness that connection reinforcement improves will be acquired.

(8) While notching demarcated by the concave bend line was formed in one flank of the upper limit section, the bend of said J typeface was formed when an upper limit edge was made to incline by the sense which becomes low as it goes to the side edge of the opposite side from the side edge of the side in which said notching was formed. Tape connection member given in (7) terms. Thus, since it is formed within the width of face of other parts of a caulking pawl, in case the formed bend is made to penetrate a components maintenance tape, it cannot form a big hole superfluously and can avoid the fall of connection precision. Moreover, since width of face is narrower than other parts, a bend can be crushed easily.

(9) the number of said two or more feed holes is three, and two or more caulking pawls of a book projected, respectively from said each of the both ends of the longitudinal direction of said body section and two pairs of each mid-position where it adjoins mutually [said three feed holes] (3) -- or -- Tape connection member of any one publication of the (8) terms. The feed hole of a tape connection member can be connected according to the feed hole per each of two components maintenance tapes on which three pieces, then every 1 of both ends should be connected mutually. In this case, the edge of the components maintenance tape which should be connected will be cut near the core of a feed hole, respectively, and will be in the condition of the feed hole of each edge of two maintenance tapes that by one half corresponds mostly at the feed hole of the center of a tape connection member. Therefore, also in each mid-position of the feed hole of these **** one half, and the perfect feed hole which adjoins them, a caulking pawl can be made to be able to penetrate a components maintenance tape, and sufficient connection reinforcement can be obtained by the comparatively short tape connection member. By connection reinforcement coming out from viewpoints, such as not becoming the obstacle of delivery of a components maintenance tape, and a cheap thing, enough, although a tape connection member is so good that it is short in a certain limitation, and it can shorten most when making a feed hole into two pieces In this case, it will be cut in the middle location of the feed hole which adjoins mutually, and the die length from a feed hole at the very end is too short, it is difficult for the edge of the components maintenance tape which should be connected to make the caulking pawl of pars intermedia penetrate, and it is desirable to make a feed hole into three pieces.

(10) Said Y-globe type pawl with which the upper limit section is divided into two forks, and the caulking pawl of a book accomplishes two or more about Y typefaces, Both J form pawls with which the upper limit section curves crosswise [of the caulking pawl], and accomplishes about J typefaces are included. The Y-globe type pawl projected from two places to which the projection and J form pawl were far apart from the both ends of the longitudinal direction of said body section in the longitudinal direction of the pars intermedia of the body section. (3) It is ** [there is nothing]. (5) terms, Tape connection member of any one publication of (8) terms and the (9) terms. In the tape connection member of this configuration, it is checked by experiment that relative displacement with dispersion, a tape connection member, and a components maintenance tape is small, and ends almost equally [the direction where each caulking pawl is crushed]. What has been mutually arranged at the symmetry so that it may arrange especially both Y-globe type pawls and J form pawls at a time crosswise [of a tape connection member / two] and the bend whose two J form pawls are them may become outward [crosswise] is good.

(11) said -- plurality -- a feed hole -- three -- a piece -- it is -- said -- J -- type -- a pawl -- them -- three -- a piece -- a feed hole -- mutual -- adjoining -- although -- between -- from -- a projection -- said -- a Y-globe type -- a pawl -- every -- J -- type -- a pawl -- from -- a feed hole -- a pitch -- being the same -- distance -- a detached building -- ***** -- from -- projecting -- **** -- (-- ten --) -- a term -- a publication -- a tape -- connection -- a member .

(12) The press plate of the pair which counters mutually in a press side, and the press device which holds in the condition that it approaches and the press plates of these pairs may be made to estrange, and presses the press side of a pair to both sides of a tape in the approach condition of these press plate, A tape connection tool including the crevice in which it is formed in the part which counters two or more locatings lug which protruded on one press side of the press plate of said pair together with the single tier, and said locating lug of the press side of another side of the press plate of said pair, and a locating lug is held at the time of approach of the press plate of a pair (claim 3). When connecting the edges of two components maintenance tapes by this tape connection tool, each locating lug is inserted in the feed hole of each edge, relative positioning of edges is performed, and the press plate of a pair is made to approach mutually according to a press device in that condition. Thereby, the body section and the components maintenance tape of a tape connection member are made to approach, and a caulking pawl is made to penetrate a components maintenance tape, and contacts the press side of the press plate of the opposite side. If a press plate is made to approach further from the condition, the body section and the components maintenance tape of a tape connection member will be made to approach further. Although a caulking pawl tends to project from a components maintenance tape, since it is in contact with the press side, only the part is crushed. When the body section of a tape connection member will be stuck to a components maintenance tape, all the parts projected to the opposite side of the components maintenance tape of a caulking pawl will be in the condition of having been crushed completely, ejection is prevented, and two components maintenance tapes are connected firmly. Under the present circumstances, although the point of a locating lug projects from the field of the opposite side of a components maintenance tape, this lobe is held in the crevice formed in the press side of the press plate of the opposite side, and does not bar approach of press plates.

(13) It is combined pivotable, change and set to the bond part. the 1st lever on which said press device has a longitudinal configuration, and the part I material and the part II material -- the 1st joint shaft -- relativity -- with the 2nd turnable lever the location which was far apart from said 1st joint shaft in the longitudinal direction of said 1st lever -- setting -- the 1st joint shaft and parallel -- extending -- said 1st lever and said part I material -- relativity -- with the 2nd joint shaft combined pivotable The side which was prepared in said 1st lever and said part II material, respectively, and was combined with said part I material of said part II material The edge of the opposite side, When the edge where said 1st lever corresponds is made to approach mutually, it is engaged mutually and the supporting point is formed. The side by which the press plate of said pair was combined with said part II material of said part I material including the supporting-point formation section of the pair which carries out relative rotation of the part I material and the part II material of the 2nd lever The edge of the opposite side, A tape connection tool given in (12) terms attached in the part to which said 1st lever is equivalent, respectively. When the edge of the opposite side and the edge where said 1st lever corresponds function as the handle section, the force is applied to the handle section of these pairs and the side combined with the part I material of the part II material is made to approach mutually in the press device of this configuration, The supporting-point formation section of a pair is engaged, the supporting point is formed, and relative rotation of the part I material and the part II material of the 2nd lever is carried out. The part I material is rotated around the 2nd joint shaft, and, in the side combined with said part II material of the part I material by it, the edge of the opposite side approaches the part to which the 1st lever is equivalent. since the press plate of a pair is attached in these parts that approach mutually, these press plate is made to approach -- ** -- it becomes. Thus, if the press plate of a pair is made to be made to approach mutually by relative rotation with the part I material of the 2nd lever, and the part II material, it is not necessary to combine the 1st lever and the 2nd lever with a joint shaft in the condition of crossing mutually, and though it is the hollow object constituted with a comparatively thin plate with

both the 1st lever and the 2nd lever, it will become easy to have sufficient rigidity.

(14) (12) by which the tape presser-foot member which presses down a tape elastically to the press plate was prepared in the thing of the side in which said locating lug was prepared among the press plates of said pair, or a tape connection tool given in (13) terms. After positioning the edge of a components maintenance tape to the press plate which has a locating lug, a tape presser-foot member can be made to press down the edge, and the activity which sets the edge of two components maintenance tapes to a tape connection tool becomes easy. Although it is desirable that two tape presser-foot members are prepared and both the edges of two components maintenance tapes may be made to be pressed down, one piece is prepared and it becomes easy fairly [that only one edge may even be made to be pressed down / an activity].

[0006]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of this invention is explained to a detail based on a drawing. In drawing 1 and drawing 2, 10 is a components maintenance tape holding the SO package 12 as a kind of an electrical part, and is held in tape hold equipment 16 in the condition of having been wound around the reel 14 roughly shown in drawing 3. The SO package 12 whose components maintenance tape 10 is a flat package which has the lead wire projected from two side faces on the carrier tape 20 and the top tape 22 is taped. The carrier tape 20 is constituted by sticking the bottom tape 26 on the rear face of the body tape 24 made of pasteboard. It is prepared in the center section of the cross direction of the body tape 24 in pitches [through tube / of a large number penetrated in the thickness direction], and the components hold crevice 28 is formed in the carrier tape 20 at equal intervals by covering downward opening of this through tube on the bottom tape 26. One SO package 12 is held at a time in the components hold crevice 28, and the top tape 22 was stuck on the front face 29 of the carrier tape 20, and has covered upward opening of the components hold crevice 28. Moreover, the feed hole 32 which while it is parallel to the longitudinal direction of the carrier tape 20 penetrates along a edge 31 from the front face 29 of the carrier tape 20 to a rear face 30 is formed in pitches [single tier].

[0007] The components maintenance tape 10 is sent in the direction of a tape feed constant pitch every by tape-feed equipment 34, and the top tape 22 is removed by top tape exfoliation equipment 36. Among the SO packages 12 of a part with which the top tape 22 was removed, it is sent to an electronic-parts fetch location, and in this location, vacuum adsorption is carried out and the top SO package 12 is taken out by the adsorption nozzle of an adsorption head. Although this is supply of the SO package 12, if the components maintenance tape 10 which supply progressed and was twisted around the reel 14 approaches an end, an operator will supply the new components maintenance tape 10. The previous reel 14 by which the components maintenance tape 10 finally approached is removed, and while setting the following reel 14 which supplies the components maintenance tape 10 next, as shown in drawing 11, the trailer 37 of the components maintenance tape 10 of the point which supplies the SO package 12 actually, and the leader 38 of the following components maintenance tape 10 which supplies the SO package 12 next are connected by the tape connection member 40.

[0008] The tape connection member 40 is equipped with the feed hole 44 of plurality (three pieces when it is this operation gestalt) formed in the body section 42 which accomplishes metal rectangle tabular, and the body section 42 in pitches [feed hole / 32 / of the components maintenance tape 10], and the caulking pawl 46 which is the plurality (in the case of this operation gestalt eight pieces) made to project from the body section 42 by the right angle as shown in drawing 4 and drawing 5. Let width of face of the body section 42 be 2 double less or equal of the distance from the core of the feed hole 32 of a components maintenance tape to the side edge of a edge 31. Moreover, let the caulking pawl 46 be larger height than the thickness of the components maintenance tape 10. The caulking pawl 46 in this operation gestalt is used as the pawl which has two kinds of configurations of the Y-globe type pawl 50 projected, respectively and the J form pawl 52 projected, respectively from two pairs of each mid-position where three feed holes 44 adjoin mutually from the both ends of the longitudinal direction of the body section 42, and the Y-globe type pawl 50 and the J form pawl 52 are formed in every two places which were far apart in the longitudinal direction, respectively. In addition, it is made almost

equal by the distance from the Y-globe type pawl 50 to the core of a feed hole 32, and the distance from the J form pawl 52 to the core of a feed hole 32.

[0009] As the handle part in which the Y-globe type pawl 50 was projected and formed from the both-ends edge of the body section 42 shows drawing 5, and it is formed when bent by the right angle, and shown in drawing 6, two pieces were formed together with the cross direction, the upper limit section 53 was divided into two forks, and the transverse-plane configuration has accomplished about Y typefaces. It is made to incline by the sense to which width of face becomes narrow, and the upper limit section 53 is formed within the maximum width of the end face section 54 as the end face section 54 of the Y-globe type pawl 50 goes to the upper limit section 53, so that it may expand to drawing 7 and may be shown. Moreover, as a part of body section 42 is formed when started by the right angle as end bending shows to drawing 5, therefore shown in the body section 42 at drawing 4, opening of the configuration corresponding to the J form pawl 52 has produced the J form pawl 52. The transverse-plane configuration of the J form pawl 52 has accomplished about J typefaces to which the upper limit section curved crosswise so that it may expand to drawing 8 and may be shown. While the notching 56 demarcated by the concave bend line is formed in the flank inside [crosswise] the upper limit section, the bend 55 of this J typeface When made to incline by the sense to which the edge 58 moreover becomes low as it goes to an outside side edge from the side edge of the inside in which notching 56 was formed, it is formed, therefore the bend 55 is formed within the width of face of the end face section 59 of the J form pawl 52. The J form pawl 52 as well as the Y-globe type pawl 50 is formed together with the two cross direction, and these two J form pawls 52 are mutually arranged at the symmetry so that the above-mentioned bend 55 may become the sense among the cross direction.

[0010] Hereafter, the tape connection tool 60 for connecting the trailer 37 and leader 38 of the components maintenance tape 10 by the above-mentioned tape connection member 40 is explained. As shown in drawing 9 and drawing 10, the tape connection tool 60 is equipped with the 1st lever 62 and the 2nd lever 64 which have a longitudinal configuration. the joint shaft 66 prolonged in the direction (the cross direction is called) which intersects perpendicularly with a longitudinal direction [near the point (it sets to drawing 9 and is the left end section) of those longitudinal directions] -- the 1st lever 62 and the 2nd lever 64 -- relativity -- it is combined pivotable. The handle members 68 and 70 are attached in each back end section (it sets to drawing 9 and is the right end section) of the 1st lever 62 and the 2nd lever 64, and the handle section of a pair is formed. Moreover, the press plates 72 and 74 are attached in each point of the 1st lever 62 and the 2nd lever 64.

[0011] The body section 76 of the 1st lever 62 is equipped with the side plates 78 and 80 of two sheets prolonged in the longitudinal direction of the 1st lever 62, and is combined with relative-displacement impossible by two or more joint pins 82 by which these side plates 78 and 80 are prolonged crosswise. A cross-section configuration is the member made of synthetic resin which accomplishes U typeface, the handle member 68 which forms the handle section ****s opening of the character of U inside (the 2nd lever 64 side), and fitting of it is carried out to the body section 76, and it is being fixed to it. Moreover, the above-mentioned press plate 72 is combined with the point of the body section 76 with the joint shaft 84 prolonged crosswise. The press plate 72 is equipped with the bond part 86 with which a cross-section configuration accomplishes convex, and fitting is carried out into the body section 76, and it is combined by the body section 76 with the joint shaft 84, and the body section 90 which has the press side 88 of width of face larger than a bond part 86. the joint shaft 84 -- the press plate 72 -- the body section 76 -- receiving -- relativity -- although it has joined together pivotable, since the body section 90 with the wide width of face of the press plate 72 is in contact with the body section 76 of the 1st lever 62, the press plate 72 and the 1st lever 62 cannot be relative rotated substantially

[0012] the joint shaft 104 with which the 2nd lever 64 is equipped with the part I material 100 and the part II material 102, and the back end section of these part I material 100 and the point of the part II material 102 are prolonged in parallel with the joint shaft 66 in the bond part 103 of a longitudinal direction which was a little far apart in the back end side from the joint shaft 66 -- relativity -- it is combined pivotable. Although the part I material 100 and the part II material 102 are formed by the generally same width of face, width of face of the back end section of the part I material 100 is made

narrower than the part II material 102. Fitting of the back end section of this part I material 100 is carried out into the point of the part II material 102, and both members are combined with the joint shaft 104. In addition, although these part I material 100 and the part II material 102 are made into the generally same width of face also as the body section 76 of the 1st lever 62, it is made narrower than the body section 76, and in the body section 76, the width of face of the part by the side of the 1st lever 60 of the pars intermedia of the part I material 100 is in the condition by which fitting was carried out, and is combined with the joint shaft 66.

[0013] Like the 1st lever 62, it is combined with relative-displacement impossible by two or more joint pins by which the side plate of every two sheets prolonged in a longitudinal direction is prolonged crosswise, and the part I material 100 and the part II material 102 change, respectively. Fitting of the handle member 68 and the handle member 70 of the same configuration is carried out to the back end section of the part II material 102, and they are being fixed to it.

[0014] Said press plate 74 is combined with the point of the part I material 100 with the joint shaft 114. The press plate 74 had the cross-section configuration of a convex form generally same with the press plate 72, and is equipped with the bond part 116 by which fitting is carried out to the body section 76, and the body section 120 which has the press side 118 of width of face larger than a bond part 116. The press plate 74 as well as the press plate 72 is substantially made into relative rotation impossible to the part I material 100. The press plate 72 and the press plate 74 are held in the condition that the press side 88,118 counters mutually at the 1st lever 62 and the 2nd lever 64, respectively, and the front end section of the body section 120 and the both-sides section of the press plate 74 are beginning to be prolonged over the press plate 72. Notching 121 is prolonged crosswise and formed in the press side 118 side of this front end section that began to be prolonged. Moreover, the stopper 123 which specifies the approach limit of the press side 88,118 is formed in the location which intersects the flat surface containing the axis of said joint shaft 84 and joint shaft 114 of the press side 118.

[0015] The lobe 126 projected to the sense which approaches the body section 76 most in about 103 bond part is formed in the end face 122 inside the body section 76 of the 1st lever 62 of the part II material 102 (it sets to drawing 9 and is the bottom), and the end face 124 of the inside (it sets to drawing 9 and is the bottom) which counters. Moreover, the torsion coiled spring which omits illustration is attached in the joint shaft 66, and the part I material 100 of the 1st lever 62 and the 2nd lever 64 is energized by the sense which the press side 88,118 estranges mutually at the usual state by one arm of it engaging with the joint pin 82 of the 1st lever 62, and making the arm of another side engage with said joint pin of the part I material 100 of the 2nd lever 64, respectively. Therefore, at the time of un-operating [the force is not applied to the handle members 68 and 70 to operate], the end face 122 of the body section 76 of the 1st lever 62 and the lobe 126 of the 2nd lever 64 contacted, and it is stable in the condition that the handle members 68 and 70 were made to estrange at it. If moved to the sense which the energization force of this torsion coiled spring is resisted, and the force is applied to the handle members 68 and 70, and approaches mutually, the engagement section with the part which counters the lobe 126 of the part II material 102 and the lobe 126 of the end face 122 of the body section 76 of the 1st lever 62 will serve as the supporting point, and it will be rotated by the sense to which the point of the part II material 102 keeps away from the 1st lever 62. Consequently, the part I material 100 rotates around the joint shaft 104, and the point of the part I material 100 approaches the 1st lever 62. The press side 88 of the press plate 72 and the press side 118 of the press plate 74 are made to approach, when the point of the part I material 100 approaches the 1st lever 62.

[0016] The locatings lug [two or more (in the case of this operation gestalt six pieces)] 130, 131, and 132,133,134,135 protrude on the press side 118 of the press plate 74 together with the single tier crosswise. Locatings lug 130-135 are minor diameters more slightly than the feed holes 32 and 44 of the components maintenance tape 10 and the tape connection member 40, and are projected toward the press side 88 of the press plate 72. The locating lug 130,135 is formed in two places from which it separated in the method of both sides from the press plate 72, respectively. In the case of this operation gestalt, spacing with locatings lug 131 and 132 and spacing with locatings lug 133 and 134 are made into pitches [feed holes / 32 and 44], respectively, but it is made into the pitch twice the spacing of feed

holes 32 and 44 between locatings lug 132,133. Moreover, between locatings lug 130,131 and between locatings lug 134,135 are made into the pitch twice the spacing of a feed hole 32. In addition, each pitch of locatings lug 130-135 is selectable suitably from the value of the integral multiple of the pitch of feed holes 32 and 44.

[0017] The crevices 136-139 (it sets in this operation gestalt and is a through tube) for holding these locatings lug 131-134 are formed in the location corresponding to the locatings lug 131-134 of the press side 88 of the press plate 72 so that it may expand to drawing 14 and may be shown. Moreover, the slideway 158,159 and slideway 160,161 for deciding the buckling directions of the Y-globe type pawl 50 and the J form pawl 52 to be the both sides of a crevice 137,138 in the press side 88 are formed, respectively. A slideway 158 and a slideway 159 are made into the inclined plane which inclined in the sense which approaches mutually as they keep away from the press side 88, therefore the Y-globe type pawl 50 and the J form pawl 52 are buckled in the sense which a point (the upper limit section 53 and bend 55) approaches mutually. The slideway 158,159 forms the shallow V groove in collaboration with another inclined plane 162,163 where an inclination is loose respectively, the pars basilaris ossis occipitalis of the V groove is rounded off, and the slideway 158,159 and the inclined plane 162,163 are connected smoothly. The same is said of a slideway 160,161 and the loose inclined plane 164,165 corresponding to these slideways 160,161 is formed.

[0018] The tape presser-foot member 140,142 is further attached in two places of the method of an outside from the locating lug 130,135 of the press side 118, respectively. The cylinder-like boss member 148 is fixed to a bend, and the tape presser-foot member 140,142 is attached in the press plate 74 with the joint shaft 150 and the bracket 152, respectively while being bent by the typeface through which a band-like plate passes, pressing down and forming the section 144 and a control unit 146, as shown in drawing 12 and drawing 13. while the both ends of the joint shaft 150 which each bracket 152 was equipped with the side plate 154 of a pair, and was inserted in the above-mentioned boss member 148 are supported by the side plate 154 of a pair, a bracket 152 is fixed to the press plate 74 by proper fixed means, such as spot welding, -- the tape presser-foot member 140,142 -- the press plate 74 -- relativity -- it is attached pivotable. The torsion coiled spring 156 as a spring member is attached in each joint shaft 150, and those presser-foot sections 144 are elastically forced on the press side 118 of the press plate 74 by energizing the tape presser-foot member 140,142 by this torsion coiled spring 156. If a control unit 146 is depressed and operated toward the press plate 74, the presser-foot section 144 can be twisted, the energization force of coiled spring 156 can be resisted, and it can be made to estrange from the press side 118.

[0019] Connection of two components maintenance tapes 10 by the tape connection tool 60 constituted as mentioned above is explained. The tape connection tool 60 has the press plates 72 and 74 of the 1st and 2nd lever 62 and 64, and the handle members 68 and 70 in the condition of having estranged mutually at a usual state. In this condition, the tape connection member 40 is positioned in the press side 118 by inserting the locating lug 132,133 of the press side 118 in two of the both ends of the three feed holes 44 of the tape connection member 40. The Y-globe type pawl 50 formed in the both ends of the tape connection member 40 at this time is located in middle with locatings lug 131 and 132, and the middle with locatings lug 133 and 134, respectively. Then, in the condition that pressed down by push-down actuation of the control unit 146 of the tape presser-foot member 140, and the section 144 was made to estrange from the press side 118, locatings lug 130-132 are inserted in the feed hole 32 of the trailer 37 of the components maintenance tape 10 which supplies the current SO package 12, it presses down by push-down discharge of a control unit 146, and a trailer 37 is pressed down by the section 144. Next, it is in the condition that the presser-foot section 144 of the tape presser-foot member 142 was made to estrange from the press side 11, and locatings lug 133-135 are inserted in the feed hole 32 of the leader 38 of the components maintenance tape 10 which supplies the SO package 12 next, and a leader 38 is pressed down by the presser-foot section 144. thus, where the tape connection member 40 and the components maintenance tape 10 are positioned on the press side 118 As shown in drawing 11, the feed hole 44 of one edge of the tape connection member 40 and the feed hole 32 of the trailer 37 of the components maintenance tape 10 are in agreement. The feed hole 44 of the other end of the tape

connection member 40 and the feed hole 32 of the leader 38 of the components maintenance tape 10 are in agreement, and it will be in the condition whose half feed hole 32 corresponds with the feed hole 44 of the center of the tape connection member 40 mostly of having been formed in each edge of two components maintenance tapes 10. moreover, the above of each part article maintenance tape 10 -- it will be in the condition that the J form pawl 52 is located in the mid-position of the perfect feed hole 32 and the half feed hole 32, respectively, and the Y-globe type pawl 50 is located in the mid-position of feed hole 32 perfect comrades of each part article maintenance tape 10, and a set will be completed.

[0020] Next, if an operator makes it move in the direction which the handle members 68 and 70 are grasped and is approached mutually, the 2nd lever 64 will return to an almost straight condition by relative rotation with the part I material 100 and the part II material 102, and the press plate 74 will be made to approach the press plate 72. The tape connection member 40 is pressed for the front-face 29 side of the components maintenance tape 10 by the press side 118 according to the press side 88, respectively, and the upper limit section 53 of the Y-globe type pawl 50 and the bend 55 of the J form pawl 52 penetrate the components maintenance tape 10 in the thickness direction, are made to project from a front-face 29 side by approach with this press plate 74 and the press plate 72, and are made to contact slideways 158-161. It is made to buckle by making the press plates 72 and 74 approach further in this condition by the direction to which it is shown to the upper limit section 53 of the Y-globe type pawl 50, and the bend 55 of the J form pawl 52 at slideways 158-161 and which they approach mutually. If the press plates 72 and 74 are made to approach furthermore, the upper limit section 53 of the Y-globe type pawl 50 and the bend 55 of the J form pawl 52 will be bent by inclined planes 162-165, and will be crushed completely. The shift to inclined planes 162-165 from the slideways 158-161 of the upper limit section 53 in this case and a bend 55 is smoothly performed by the radius of circle of V groove bottom section. It crushes, and sometimes, the Y-globe type pawl 50 is crushed in the direction containing the component of the direction where this part divided at the two forks of the upper limit section 53 is further pushed open by a slideway 158,161 and the inclined plane 162,165, and the J form pawl 52 is crushed in the direction in which a bend 55 contains a crosswise component by the slideway 159,160 and the inclined plane 163,164. When the body section 42 of the tape connection member 40 will be stuck to the rear face 30 of the components maintenance tape 10, all the parts projected to the front-face 29 side of the components maintenance tape 10 of the Y-globe type pawl 50 and the J form pawl 52 will be in the condition of having been crushed completely, the ejection of the tape connection member 40 is prevented, and two components maintenance tape 10 comrades are connected firmly. Although the point of the locatings lug 131-134 prepared in the press side 118 projects from the front face 29 of the components maintenance tape 10 at this time, since this lobe is held in the crevices 136-139 formed in the press side 88, it does not bar approach of the press plate 72 and 74 comrades. Moreover, since the approach limit of the press side 88,118 is prescribed by the stopper 123, the components maintenance tape 10, the Y-globe type pawl 50, and J form pawl 52 grade are not crushed superfluously.

[0021] Thus, if the handle members 68 and 70 are released after two components maintenance tapes 10 are connected, the tape connection tool 60 will be returned to the condition that the point of the part I material 100 estranged from the 1st lever 62 according to the energization force of said torsion coiled spring, and press side 88,118 comrades estranged. If the presser-foot section 144 of the tape presser-foot member 140,142 is made to estrange from the press side 118 in the condition, removal from the tape connection tool 60 of two connected components maintenance tapes 10 will be attained.

[0022] the case where the components maintenance tape 10 is a paper tape -- above -- the Y-globe type pawl 50 and the J form pawl 52 -- almost -- the upper limit section 53 and a bend 55 -- the components maintenance tape 10 -- penetrating -- caulking ****. Although the die length which projects from the front face 29 of the components maintenance tape 10 of the Y-globe type pawl 50 and the J form pawl 52 is short, and it will be hard to be made to buckle if it is usual The upper limit section 53 and a bend 55 are crushed in the direction which had a crosswise component respectively easily [width of face is narrower than other parts of the Y-globe type pawl 50 and the J form pawl 52, and / since it inclines crosswise and is formed], and balking from the components maintenance tape 10 is prevented good. The trailer 37 of the components maintenance tape 10 which supplies the current SO package 12, and

the leader 38 of the components maintenance tape 10 which supplies the SO package 12 next are connected certainly.

[0023] When the components maintenance tape which should be connected to it is an embossing tape, since it is thin as compared with a paper tape, the thickness of the part which should be connected penetrates a components maintenance tape to a part with the Y-globe type pawl 50 and the J form pawl 52 not only near the upper limit section 53 and the bend 55 but the end face section. And although these parts projected for a long time are closed, since the approach limit of the press side 88,118 is prescribed by the stopper 123, it is not made to vomit them completely until the whole lobe sticks the Y-globe type pawl 50 and the J form pawl 52 to the front face of a components maintenance tape, and pars intermedia will be in the condition of having lost slightly touch with the front face of a components maintenance tape. However, the upper limit section 53 and a bend 55 are stuck to the front face of a components maintenance tape, and since they will be in the condition of pinching the part with which a components maintenance tape should be connected in collaboration with the body section 42 from both sides, they are certainly connected also with the leader of an embossing tape, and a trailer. Although an embossing tape will be crushed superfluously and will spread crosswise if it is perfect in the Y-globe type pawl 50 and the J form pawl 52 or an embossing tape is connected in total by the tape connection tool which does not have a stopper 123, generating of such an inconvenient situation is prevented by the stopper 123 good. In addition, when connecting an embossing tape, and the embossing section is received by the part in which the notching 121 of said press plate 74 was formed, the side edge sections of a tape can be connected good, without damaging the embossing section.

[0024] The 1st joint shaft and the joint shaft 66 constitute [the joint shaft 104 in this operation gestalt] the 2nd joint shaft, respectively so that clearly from the above explanation. Moreover, the part corresponding to the lobe 126 of the side face 122 of the lobe 126 formed in the part II material 102 of the 2nd lever 64 and the body section 76 of the 1st lever 62 constitutes the supporting-point formation section of a pair, and the 1st lever 62, the 2nd lever 64, the joint shaft 66,104, and the above-mentioned supporting-point formation section constitute the press device.

[0025] According to the tape connection member 40 and the tape connection tool 60 in this operation gestalt, not only connection of paper tapes but connection of embossing tapes can be performed, and it can also apply to the various components maintenance tapes on which thickness differs.

[0026] Moreover, while the Y-globe type pawl 50 and the J form pawl 52 are crushed in the direction approached mutually in this operation gestalt Since the direction where the upper limit section 53 of the Y-globe type pawl 50 and the bend 55 of the J form pawl 52 are crushed is divided crosswise almost equally, While the thing of a pawl which it follows on crushing and a gap produces between the tape connection member 40 and the components maintenance tape 10 is prevented good, balking from the components maintenance tape 10 of both the pawls 50 and 52 is prevented good, and sufficient bond strength is obtained. Moreover, since width of face is narrowed for the upper limit section 53 of the Y-globe type pawl 50, or the bend 55 of the J form pawl 52 rather than the end face section of each pawl, an excessive hole is not formed in the components maintenance tape 10 in case these penetrate the components maintenance tape 10. When the forked upper limit section 53 and a forked bend 55 have projected from the end face section of each pawl to the side Even if the end face section inserts in the hole formed when they passed, a clearance is generated in the side. Although migration may be permitted, the relative-position arrangement precision of the components maintenance tape 10 and the tape connection member 40 may become inadequate and the relative-position arrangement precision between two components maintenance tape 10 may become inadequate after all Sufficient relative-position arrangement precision is acquired in this operation gestalt. Moreover, it becomes easy by narrowing width of face rather than the end face section of each pawl for these upper limit section 53 and a bend 55 to push crush the upper limit section 53 of the Y-globe type pawl 50 and the bend 55 of the J form pawl 52, both the pawls 50 and 52 are buckled in the end face section, and it is also prevented good that poor connection occurs.

[0027] Furthermore, in the part II material 102 of the 2nd lever 64, since distance from a lobe 126 to the back end section (handle member 70) is enlarged from the lobe 126 which functions as the supporting-

point formation section as compared with the distance to the joint shaft 104, it can close whether it is firm in the tape connection member 40 by the comparatively small force. however, the configuration of the 1st and 2nd lever is not necessarily limited to the thing of this operation gestalt, for example, crosses both levers as in the usual tool -- making -- the intersection -- setting -- a joint shaft -- relativity -- joining together pivotable is also possible.

[0028] In the tape connection member 40 in said operation gestalt, although the Y-globe type pawl 50 was formed in the both ends of a longitudinal direction and it was formed [it was / the J form pawl 52 / far apart and] in the longitudinal direction in the meantime, about the configuration of a caulking pawl, it is selectable suitably to arrangement of a Y-globe type pawl and J form pawl, and a pan. Moreover, the tape connection member 40 can also be considered as the gestalt which the body section 42 is stuck in the rear face 30 of the components maintenance tape 10, and ** to which the caulking pawl 46 projected from the front-face 29 side was closed makes stick the body section 42 to a front face 29, and closes the caulking pawl 46 from a rear-face 30 side.

[0029] In said operation gestalt, although the tape connection tool 60 was equipped with one tape connection member 40 for every connection of a components maintenance tape, it is also possible to make it possible to do this connection activity continuously. For example, it is also possible to consider as the gestalt which loads with the thing [as / in a stapler] which connected two or more tape connection members 40 of the above-mentioned operation gestalt and tape connection members of the same configuration crosswise into the tape connection tool beforehand, sends out one piece at a time, separates one by one, is moved to a connection location, and connects a components maintenance tape. In addition, in this case, in order to move a tape connection member smoothly, it is desirable to make at least one side of the caulking pawl formed in the both ends of a tape connection member prolonged [begin] along with the side edge of a tape connection member, and to use the side face of the outside of that caulking pawl as a guide. In addition, this invention can be carried out with the gestalt which performed various modification and amelioration based on this contractor's knowledge, without deviating from a claim.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the top view showing the components maintenance tape connected by the tape connection approach which is 1 operation gestalt of this invention.

[Drawing 2] It is the side-face sectional view of the above-mentioned components maintenance tape.

[Drawing 3] The above-mentioned components maintenance tape is held and it is drawing showing the components feeder to send roughly.

[Drawing 4] It is the top view showing the tape connection member which is 1 operation gestalt of this invention.

[Drawing 5] It is the front view of the above-mentioned tape connection member.

[Drawing 6] It is the side elevation of the above-mentioned tape connection member.

[Drawing 7] It is drawing expanding and showing the caulking pawl of the above-mentioned tape connection member.

[Drawing 8] It is drawing expanding and showing another caulking pawl of the above-mentioned tape connection member.

[Drawing 9] It is the side elevation showing the tape connection tool which is 1 operation gestalt of this invention.

[Drawing 10] It is the front view of the above-mentioned tape connection tool.

[Drawing 11] It is the side-face sectional view showing the condition that the above-mentioned tape connection member and the components maintenance tape were positioned by the above-mentioned tape connection tool.

[Drawing 12] It is the front view showing the tape presser-foot member of the above-mentioned tape connection tool.

[Drawing 13] It is the right side view of the above-mentioned tape presser-foot member.

[Drawing 14] It is the front view showing the press plate of the above-mentioned tape connection tool.

[Description of Notations]

10: Components maintenance tape 12:SO package 28: Components hold crevice 32: Feed hole 37: Trailer 38: Leader 40: Tape connection member 42: Body section 44: Feed hole 46: Caulking pawl 50: Y-globe type pawl 52:J type pawl 60: Tape connection tool 62: The 1st lever 64: The 2nd lever 66: Joint shaft 72 74: Press plate 88,118: Press side 100: Part I material 102: Part II material 104: Joint shaft 122,124: Side face 126: Lobe 130-135: Locating lug 136-139: Crevice

[Translation done.]

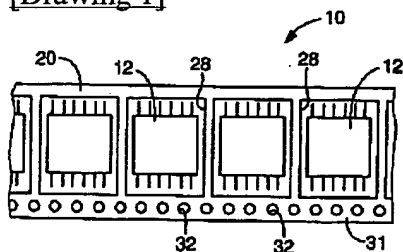
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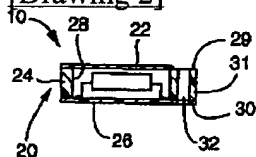
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DRAWINGS

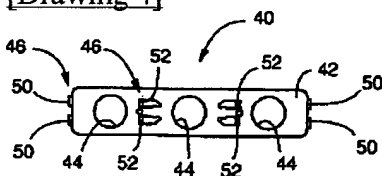
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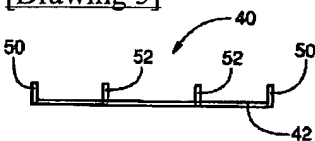
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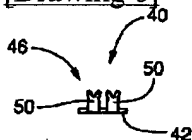
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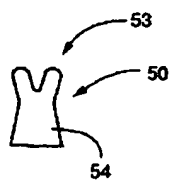
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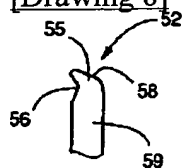
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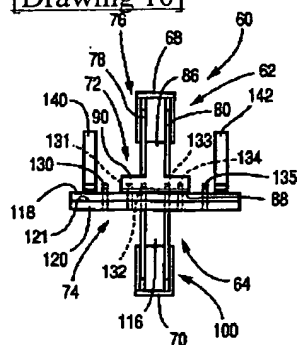
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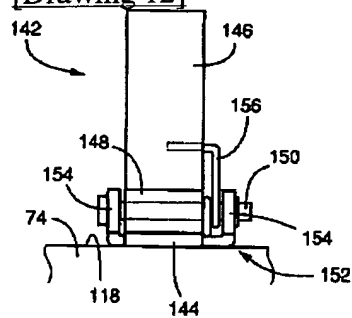
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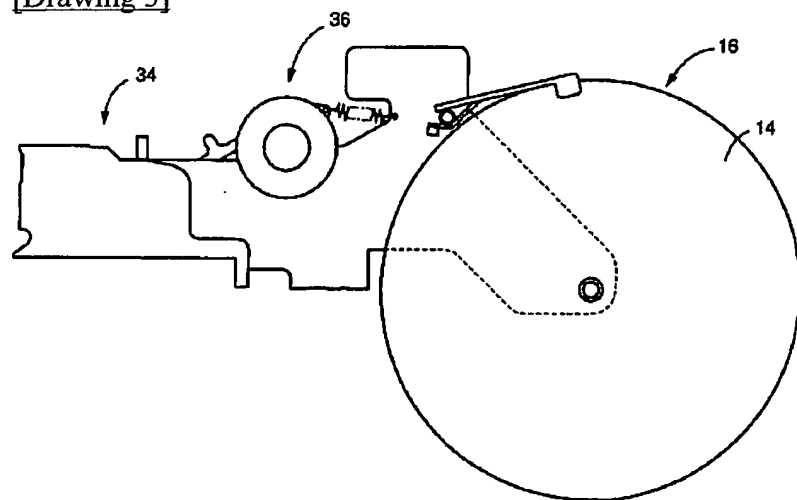
[Drawing 10]



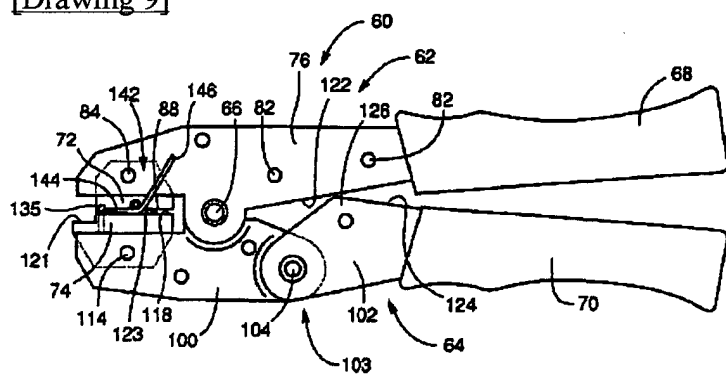
[Drawing 12]



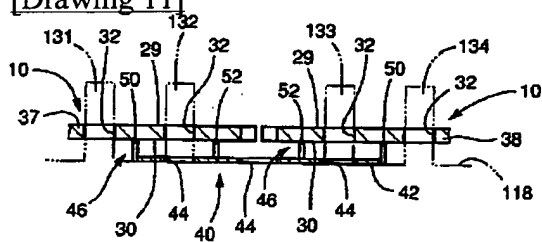
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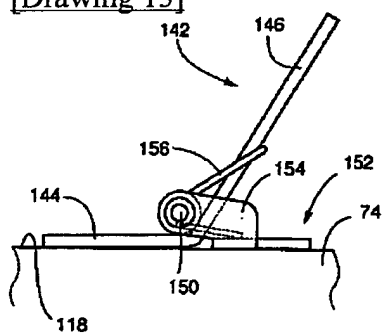
[Drawing 9]



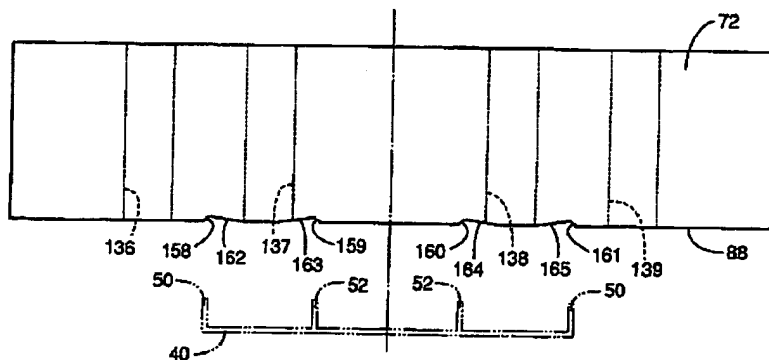
[Drawing 11]



[Drawing 13]



[Drawing 14]



[Translation done.]

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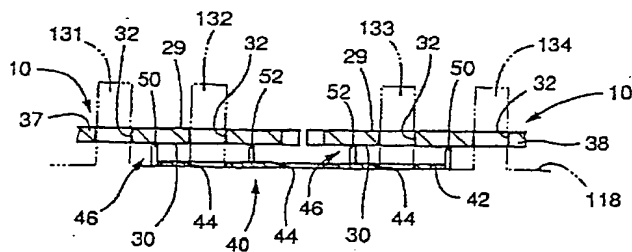
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(54)【発明の名称】 テープの連結方法、連結部材および連結工具

(57)【要約】

【課題】部品保持テープの端部同士を強固に連結し得る連結方法、連結部材および連結工具を得る。

【解決手段】テープ連結工具の押圧面118に突設した位置決め突起132、133をテープ連結部材40の両端の送り孔44に挿入し、部品保持テープ10の終端部37および始端部38の各送り孔32に位置決め突起131~134等を挿入することにより、テープ連結部材40と部品保持テープ10の各端部との相対位置決めを行う。テープ連結工具の作動により、テープ連結部材40のかしめ爪46に部品保持テープ10を厚さ方向に貫通させ、テープ連結部材40の本体部42と部品保持テープ10の裏面30とを密着させるとともにかしめ爪46の突出部をかしめることにより、部品保持テープ10の終端部37と始端部38とを連結する。



【特許請求の範囲】

【請求項1】 長手方向に延びる2本の直線に沿って多数の部品収容凹部と送り孔とがそれぞれ一定ピッチで形成され、部品収容凹部に電気部品を1個ずつ収容する部品保持テープの端同士を連結する方法であって、複数の送り孔が前記部品保持テープの送り孔と等しいピッチで形成された板状の本体部から複数本のかしめ爪が本体部に直角に突出させられたテープ連結部材を用い、そのテープ連結部材の複数の送り孔の少なくとも1個ずつを、連結すべき2本の部品保持テープのそれぞれ端部の送り孔に一致させた状態で、複数本のかしめ爪の少なくとも1本ずつにそれぞれの部品保持テープを厚さ方向に貫通させ、前記本体部を部品保持テープの一面に密着させるとともに、反対側の面からのかしめ爪の突出部をかしめることにより、部品保持テープの端部同士を連結するテープ連結方法。

【請求項2】 複数の送り孔が等ピッチで形成された板状の本体部から、複数本のかしめ爪が本体部に直角に突出させられたテープ連結部材。

【請求項3】 押圧面において互いに対向する一対の押圧板と、それら一対の押圧板同士を接近、離間させ得る状態で保持し、それら押圧板の接近状態において一対の押圧面をテープの両面に押圧する押圧機構と、前記一対の押圧板の一方の押圧面に一列に並んで突設された複数の位置決め突起と、前記一対の押圧板の他方の押圧面の前記位置決め突起に対向する部分に形成され、一対の押圧板の接近時に位置決め突起を収容する凹部とを含むテープ連結工具。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、部品保持テープの端部同士を連結する方法、その方法の実施に使用される連結部材および連結工具に関するものである。

【0002】

【従来の技術】部品保持テープは、長手方向に延びる2本の直線に沿って多数の部品収容凹部と送り孔とがそれぞれ一定ピッチで形成され、部品収容凹部に電気部品を1個ずつ収容するものである。この部品保持テープを部品収容凹部の形成ピッチずつ送り、各部品収容凹部から電気部品を1個ずつ順次供給することが広く行われている。この場合、部品保持テープはリールに巻かれたり、収容容器内に収容され、始端部から引き出されて、送り機構により送られるのであるが、終端部近くになれば、その終端部に新しい部品保持テープの始端部を連結し、前の部品保持テープに続いて新しい部品保持テープから電気部品を供給することが行われている。

【0003】上記連結には、粘着テープやテープ連結チップが使用されている。部品保持テープが、厚さ方向に貫通した多数の貫通孔を有する厚紙製のテープの裏面に

ボトムテープが貼りつけられたキャリアテープと、そのキャリアテープの表面に貼りつけられて貫通孔の上向きの開口を覆うトップテープとを含む紙テープである場合には、キャリアテープとトップテープとの両方が粘着テープにより連結されることが多い。それに対し、部品保持テープが、合成樹脂製のテープに長手方向に多数のエンボスが形成されたキャリアテープと、そのキャリアテープの表面に貼りつけられてエンボスの開口を覆うトップテープとを含むエンボステープである場合には、キャリアテープがメタルチップで連結され、トップテープが粘着テープで連結されることがあった。メタルチップは、長手形状を成す金属板に部品保持テープの送り孔と同ピッチで送り孔が形成されるとともに、各送り孔の間に、バーリング加工により周縁にバリが形成された連結孔が形成され、バリがキャリアテープに食い込まれることにより、連結機能を果たすものである。

【0004】しかし、表裏両側共粘着テープにより連結される場合には、連結強度や連結された両端部の送り孔のピッチ精度が不足し勝ちであり、連結の信頼性が不十分である問題があった。バーリング加工されたメタルチップを使用すれば、エンボステープにおいては、ある程度信頼性が向上するが、紙テープでは不十分であり、実用に供し得ない問題があった。メタルチップの本体部は、部品保持テープと共に湾曲可能とするために薄くする必要があり、薄い金属板から十分な高さのバリを突出させることが困難であり、低いバリを紙製のキャリアテープに食い込ませても十分な連結強度が得られないからである。

【0005】

【発明が解決しようとする課題、課題解決手段、作用および効果】本発明は、以上の事情を背景として、エンボステープでも紙テープでも十分な信頼性を以て連結し得るようにすることを課題としてなされたものであり、本発明によれば、以下の各態様のテープ連結方法、テープ連結部材およびテープ連結工具が得られる。各態様は、請求項と同様に項に分け、各項に番号を付し、必要に応じて他の項の番号を引用する形式で記載する。各態様の構成要素の組合わせの可能性を明示するためである。

(1) 長手方向に延びる2本の直線に沿って多数の部品収容凹部と送り孔とがそれぞれ一定ピッチで形成され、部品収容凹部に電気部品を1個ずつ収容する部品保持テープの端同士を連結する方法であって、複数の送り孔が前記部品保持テープの送り孔と等しいピッチで形成された板状の本体部から複数本のかしめ爪が本体部に直角に突出させられたテープ連結部材を用い、そのテープ連結部材の複数の送り孔の少なくとも1個ずつを、連結すべき2本の部品保持テープのそれぞれ端部の送り孔に一致させた状態で、複数本のかしめ爪の少なくとも1本ずつにそれぞれの部品保持テープを厚さ方向に貫通させ、前記本体部を部品保持テープの一面に密着させるととも

に、反対側の面からのかしめ爪の突出部をかしめることにより、部品保持テープの端部同士を連結するテープ連結方法（請求項1）。このように、テープ連結部材のかしめ爪に部品保持テープを貫通させ、テープ連結部材の本体部を部品保持テープの一方の面に密着させるとともに、反対側の面からのかしめ爪の突出部をかしめることにより部品保持テープの端部同士を連結すれば、エンボステープは勿論、紙テープであっても十分な信頼性を以て連結することができる。かしめ爪は十分な高さに形成することができ、部品保持テープの反対側まで突出させ、突出端部をかしめることにより、紙テープであっても十分な強度で連結することができるのである。

(2) 前記部品保持テープに前記送り孔が、その部品保持テープの幅方向の片側に寄せて形成されており、前記テープ連結部材の幅が、部品保持テープの送り孔の中心から近い側の側縁までの距離の2倍以下である(1)項に記載のテープ連結方法。このようにすれば、連結部材の本体部の幅を小さくすることができ、本体部を比較的厚くしても、部品保持テープと共に湾曲させることができる。本体部を厚くすることができれば、その一部を曲げ起こしてかしめ爪を形成する場合に、かしめ爪に十分な強度を持たせることができる。

(3) 複数の送り孔が等ピッチで形成された板状の本体部から、複数本のかしめ爪が本体部に直角に突出させられたテープ連結部材（請求項2）。本形態のテープ連結部材を使用すれば、前記テープ連結方法を実施することができる。

(4) 前記テープ連結部材が金属板により形成され、前記かしめ爪がその金属板の一部が直角に曲げ起こされることにより形成された(3)項に記載のテープ連結部材。この形態のテープ連結部材は容易に安価に製造することができる。

(5) 前記かしめ爪がテープ連結部材の幅方向に並んで複数個ずつ設けられた(3)または(4)項のいずれか1つに記載のテープ連結部材。かしめ爪をテープ連結部材の幅方向に並んで複数個ずつ設ければ、幅が狭く、容易にかしめ得るかしめ爪によって、十分な連結強度を得ることが可能となる。また、同数のかしめ爪をテープ連結部材の長手方向に並べて設ける場合に比較してテープ連結部材の長さを短くすることが可能となる。

(6) 前記複数本のかしめ爪の少なくとも1本の正面形状が、上端部が二股に分かれてほぼY字形を成す(3)ないし(5)項のいずれか1つに記載のテープ連結部材。この形状のかしめ爪の二股に分かれた部分を平らな押圧面で押しつぶせば、二股に分かれた部分がさらに押し開かれる方向の成分を含む方向に押しつぶされ、かしめ爪の拔出しが良好に防止されて、連結強度が向上する効果が得られる。

(7) 前記複数本のかしめ爪の少なくとも1本の正面形状が、上端部がそのかしめ爪の幅方向に湾曲してほぼJ

字形を成す(3)ないし(6)項のいずれか1つに記載のテープ連結部材。この形状のかしめ爪の幅方向に湾曲した部分を平らな押圧面で押しつぶせば、湾曲した部分が幅方向の成分を含む方向に押しつぶされ、かしめ爪の拔出しが良好に防止されて、連結強度が向上する効果が得られる。

(8) 前記J字形の湾曲部が、上端部の一側部に凹曲線で画定される切欠が形成されるとともに、上端縁が、前記切欠が形成された側の側端から反対側の側端に向かうに従って低くなる向きに傾斜させられることにより形成された(7)項に記載のテープ連結部材。このようにして形成された湾曲部は、かしめ爪の他の部分の幅内で形成されるため、部品保持テープを貫通させられる際、不必要に大きな穴を形成することがなく、連結精度の低下を回避することができる。また、湾曲部は他の部分より幅が狭いため、容易に押しつぶすことができる。

(9) 前記複数の送り孔が3個であり、かつ、前記複数本のかしめ爪が、前記本体部の長手方向の両端の各々と、前記3個の送り孔の互いに隣接する2対の各中間位置とからそれぞれ突出した(3)ないし(8)項のいずれか1つに記載のテープ連結部材。テープ連結部材の送り孔を3個とすれば、両端の1個ずつを、互いに連結されるべき2本の部品保持テープのそれぞれ1個ずつの送り孔に合わせて連結することができる。この場合、互いに連結されるべき部品保持テープの端は、それぞれ送り孔の中心近傍で切断されることとなり、テープ連結部材の中央の送り孔には、2本の保持テープのそれぞれの端の送り孔のほぼ半分ずつが対応する状態となる。したがって、それらほぼ半分の送り孔とそれらに隣接する完全な送り孔との各中間位置においても、かしめ爪に部品保持テープを貫通させることができ、比較的短いテープ連結部材によって、十分な連結強度を得ることができる。テープ連結部材は、部品保持テープの送りの邪魔にならないこと、安価であること等の観点から、連結強度が十分である限りにおいて短いほどよいのであり、送り孔を2個とする場合に最も短くし得るが、この場合には、互いに連結されるべき部品保持テープの端は、互いに隣接する送り孔の中間の位置で切断されることとなり、一番端の送り孔からの長さが短すぎ、中間部のかしめ爪を貫通させることが困難であり、送り孔を3個とすることが望ましいのである。

(10) 前記複数本のかしめ爪が、上端部が二股に分かれてほぼY字形を成すY形爪と、上端部がそのかしめ爪の幅方向に湾曲してほぼJ字形を成すJ形爪との両方を含み、Y形爪が前記本体部の長手方向の両端から突出し、J形爪が本体部の中間部の長手方向に隔たった2箇所から突出した(3)ないし(5)項、(8)項、(9)項のいずれか1つに記載のテープ連結部材。この形状のテープ連結部材においては、各かしめ爪のつぶされる方向がほぼ均等にばらつき、テープ連結部材と部品保持テープと

の相対移動が小さくて済むことが実験によって確認されている。特に、Y形爪とJ形爪とを共に、テープ連結部材の幅方向に2個ずつ並べたものであって、かつ、2個のJ形爪がその湾曲部が幅方向外向きになるように互いに対称に配置されたものが良好である。

(11) 前記複数の送り孔が3個であり、前記J形爪がそれら3個の送り孔の互いに隣接するものの間から突出し、前記Y形爪が各J形爪から送り孔のピッチと同じ距離離れた位置から突出している(10)項に記載のテープ連結部材。

(12) 押圧面において互いに対向する一対の押圧板と、それら一対の押圧板同士を接近、離間させ得る状態で保持し、それら押圧板の接近状態において一対の押圧面をテープの両面に押圧する押圧機構と、前記一対の押圧板の一方の押圧面に一列に並んで突設された複数の位置決め突起と、前記一対の押圧板の他方の押圧面の前記位置決め突起に対向する部分に形成され、一対の押圧板の接近時に位置決め突起を収容する凹部とを含むテープ連結工具(請求項3)。このテープ連結工具により2本の部品保持テープの端部同士を連結する場合には、それぞれの端部の送り孔に各位置決め突起を挿入して端部同士の相対的な位置決めを行い、その状態で一対の押圧板を押圧機構により互いに接近させる。それにより、テープ連結部材の本体部と部品保持テープとが接近させられ、かしめ爪が部品保持テープを貫通させられて、反対側の押圧板の押圧面に当接する。その状態からさらに押圧板を接近させれば、テープ連結部材の本体部と部品保持テープとが一層接近させられ、その分だけかしめ爪が部品保持テープから突出しようとするが押圧面に当接しているため押しつぶされ、テープ連結部材の本体部が部品保持テープに密着した状態になった時点では、かしめ爪の部品保持テープの反対側へ突出した部分がすべて完全に押しつぶされた状態となり、抜け出しが防止されて、2本の部品保持テープ同士が強固に連結される。この際、位置決め突起の先端部が部品保持テープの反対側の面から突出するが、この突出部は反対側の押圧板の押圧面に形成された凹部に収容され、押圧板同士の接近を妨げることがない。

(13) 前記押圧機構が、長手形状を有する第1レバーと、第1部材と第2部材とが第1結合軸により相対回転可能に結合されて成り、その結合部において屈曲可能な第2レバーと、前記第1結合軸から前記第1レバーの長手方向に隔たった位置において第1結合軸と平行に延び、前記第1レバーと前記第1部材とを相対回転可能に結合する第2結合軸と、前記第1レバーと前記第2部材とにそれぞれ設けられ、前記第2部材の前記第1部材と結合された側とは反対側の端部と、前記第1レバーの対応する端部とが互いに接近させられる場合に、互いに係合して支点を形成し、第2レバーの第1部材と第2部材とを相対回転させる一対の支点形成部とを含み、前記一

対の押圧板が、前記第1部材の前記第2部材と結合された側とは反対側の端部と、前記第1レバーの対応する部分とにそれぞれ取り付けられた(12)項に記載のテープ連結工具。この構成の押圧機構において、第2部材の第1部材と結合された側とは反対側の端部と、前記第1レバーの対応する端部とがハンドル部として機能し、それら一対のハンドル部に力加えられて互いに接近させられるとき、一対の支点形成部が係合して支点を形成し、第2レバーの第1部材と第2部材とを相対回転させる。第1部材を第2結合軸のまわりに回転させるのであり、それによって第1部材の前記第2部材と結合された側とは反対側の端部が、第1レバーの対応する部分に接近する。それら互いに接近する部分に一対の押圧板が取り付けられているため、それら押圧板が接近させられることとなる。このように、第2レバーの第1部材と第2部材との相対回転によって一対の押圧板が互いに接近させられるようにすれば、第1レバーと第2レバーとを互いに交差する状態で結合軸により結合する必要がなく、第1レバーと第2レバーとの両方を比較的薄い板によって構成される中空体でありながら、十分な剛性を有するものとするのが容易になる。

(14) 前記一対の押圧板のうち、前記位置決め突起が設けられた側のものに、その押圧板にテープを弾性的に押さえつけるテープ押さえ部材が設けられた(12)または(13)項に記載のテープ連結工具。位置決め突起を有する押圧板に部品保持テープの端部を位置決めした後、その端部をテープ押さえ部材に押さえさせておくことができ、2本の部品保持テープの端部をテープ連結工具にセットする作業が容易になる。テープ押さえ部材を2個設けて、2本の部品保持テープの端部を共に押さえさせ得るようにすることが望ましいが、1個設けて一方の端部のみを押さえさせ得るようにするのみでも、作業は相当容易となる。

【0006】

【発明の実施の形態】以下、本発明の一実施形態を図面に基づいて詳細に説明する。図1および図2において、10は、電気部品的一种としてのSOパッケージ12を保持する部品保持テープであり、図3に概略的に示すリール14に巻かれた状態でテープ収容装置16に収容されている。部品保持テープ10は、キャリアテープ20とトップテープ22とによって、2側面から突出したリード線を有するフラットパッケージであるSOパッケージ12がテープニングされたものである。キャリアテープ20は、厚紙製の本体テープ24の裏面にボトムテープ26が貼り付けられることにより構成されている。本体テープ24の幅方向の中央部には、厚さ方向に貫通した多数の貫通孔が等ピッチで設けられており、この貫通孔の下向きの開口がボトムテープ26で覆われることにより、キャリアテープ20に部品収容凹部28が等間隔に形成されている。部品収容凹部28にはSOパッケージ

12が1個ずつ収容されており、トップテープ22はキャリアテープ20の表面29に貼り付けられて部品収容凹部28の上向きの開口を覆っている。また、キャリアテープ20の長手方向に平行な一方の縁部31に沿って、キャリアテープ20の表面29から裏面30まで貫通する送り孔32が一行に等ピッチで形成されている。

【0007】テープ送り装置34により部品保持テープ10がテープ送り方向に一定ピッチずつ送られ、トップテープ剥離装置36によりトップテープ22が剥がされる。トップテープ22が剥がされた部分のSOパッケージ12のうち、先頭のSOパッケージ12が電子部品取出位置に送られ、この位置において吸着ヘッドの吸着ノズルに真空吸着されて取り出される。これがSOパッケージ12の供給であるが、供給が進んでリール14に巻き付けられた部品保持テープ10が終わりに近づけば、作業者が新しい部品保持テープ10を補給する。部品保持テープ10が終わりに近づいた先のリール14を外し、次に部品保持テープ10を供給する次のリール14をセットするとともに、図11に示すように、現にSOパッケージ12を供給している先の部品保持テープ10の終端部37と、次にSOパッケージ12を供給する次の部品保持テープ10の始端部38とをテープ連結部材40により連結するのである。

【0008】テープ連結部材40は、図4および図5に示すように、金属製の矩形板状を成す本体部42と、本体部42に部品保持テープ10の送り孔32と等ピッチで形成された複数（本実施形態の場合3個）の送り孔44と、本体部42から直角に突出させられた複数（本実施形態の場合8個）のかしめ爪46とを備えている。本体部42の幅は、部品保持テープの送り孔32の中心から縁部31の側縁までの距離の2倍以下とされている。また、かしめ爪46は、部品保持テープ10の厚さよりも大きい高さでされている。本実施形態におけるかしめ爪46は、本体部42の長手方向の両端部からそれぞれ突出したY形爪50と、3個の送り孔44の互いに隣接する2対の各中間位置からそれぞれ突出したJ形爪52との2種類の形状を有する爪とされており、Y形爪50とJ形爪52とはそれぞれ長手方向に隔たった2箇所ずつに設けられている。なお、Y形爪50から送り孔32の中心までの距離と、J形爪52から送り孔32の中心までの距離とはほぼ等しくされている。

【0009】Y形爪50は、本体部42の両端縁から突出して形成された耳部が、図5に示すように、直角に曲げられることにより形成されたものであり、図6に示すように、幅方向に並んで2個形成され、その正面形状は上端部53が二股に分かれてほぼY字形を成している。図7に拡大して示すように、Y形爪50の基端部54は、上端部53に向かうにつれて幅が狭くなる向きに傾斜させられており、上端部53は基端部54の最大幅内で形成されている。また、J形爪52は、本体部42の

一部が、切り曲げにより図5に示すように直角に曲げ起こされることにより形成されたものであり、したがって、本体部42には、図4に示すように、J形爪52に対応する形状の開口が生じている。図8に拡大して示すように、J形爪52の正面形状は、上端部が幅方向に湾曲したほぼJ字形を成している。このJ字形の湾曲部55は、上端部の幅方向内側の側部に凹曲線で画定される切欠56が形成されるとともに、その上端縁58が、切欠56が形成された内側の側端から外側の側端に向かうに従って低くなる向きに傾斜させられることにより形成されており、したがって、湾曲部55は、J形爪52の基端部59の幅内で形成されている。J形爪52もY形爪50と同様に幅方向に2個並んで形成されており、これら2個のJ形爪52は、上記湾曲部55が幅方向の内向きになるように互いに対称に配置されている。

【0010】以下、上記テープ連結部材40により部品保持テープ10の終端部37と始端部38とを連結するためのテープ連結工具60について説明する。図9および図10に示すように、テープ連結工具60は、長手形状を有する第1レバー62および第2レバー64を備えている。それらの長手方向の先端部（図9において左端部）近傍において、長手方向に直交する方向（幅方向と称する）に延びる結合軸66により第1レバー62と第2レバー64とが相対回転可能に結合されている。第1レバー62および第2レバー64の各後端部（図9において右端部）にはハンドル部材68、70が取り付けられて一対のハンドル部が形成されている。また、第1レバー62、第2レバー64の各先端部には、押圧板72、74が取り付けられている。

【0011】第1レバー62の本体部76は、第1レバー62の長手方向に延びる2枚の側板78、80を備え、これら側板78、80が幅方向に延びる複数の結合ピン82により相対移動不能に結合されている。ハンドル部を形成するハンドル部材68は、横断面形状がU字形を成す合成樹脂製の部材であり、Uの字の開口部を内側（第2レバー64側）にして本体部76に嵌合され、固定されている。また、本体部76の先端部に上記押圧板72が、幅方向に延びる結合軸84により結合されている。押圧板72は、断面形状が凸状を成し、本体部76内に嵌合されて結合軸84により本体部76に結合される結合部86と、結合部86より広い幅の押圧面88を有する本体部90とを備えている。結合軸84は、押圧板72を本体部76に対して相対回転可能に結合しているが、押圧板72の幅の広い本体部90が第1レバー62の本体部76に当接しているため、押圧板72と第1レバー62とは実質的に相対回転不能である。

【0012】第2レバー64は、第1部材100と第2部材102とを備え、これら第1部材100の後端部と第2部材102の先端部とが、結合軸66より長手方向のやや後端側に隔たった結合部103において、結合軸

66と平行に延びる結合軸104により相対回転可能に結合されている。第1部材100と第2部材102とは概して同じ幅で形成されているが、第1部材100の後端部の幅が第2部材102よりも狭くされている。この第1部材100の後端部が第2部材102の先端部内に嵌合され、結合軸104により両部材が結合されているのである。なお、これら第1部材100および第2部材102は第1レバー62の本体部76とも概して同じ幅とされているが、第1部材100の中間部の第1レバー60側の部分の幅が本体部76よりも狭くされ、本体部76内に嵌合された状態で、結合軸66により結合されている。

【0013】第1部材100と第2部材102とはそれぞれ、第1レバー62と同様に、長手方向に延びる2枚ずつの側板が幅方向に延びる複数の結合ピンにより相対移動不能に結合されて成るものである。第2部材102の後端部には、ハンドル部材68と同様な構成のハンドル部材70が嵌合され、固定されている。

【0014】第1部材100の先端部には、前記押圧板74が結合軸114により結合されている。押圧板74は、押圧板72と同じく概して凸形の断面形状を有し、本体部76に嵌合される結合部116と、結合部116より広い幅の押圧面118を有する本体部120とを備えている。押圧板74も押圧板72と同様に第1部材100に対して実質的に相対回転不能とされている。押圧板72と押圧板74とは、押圧面88、118が互いに対向する状態で第1レバー62、第2レバー64にそれぞれ保持されており、押圧板74の本体部120の前端部および両側部は、押圧板72を越えて延び出している。この延び出した前端部の押圧面118側には切欠121が幅方向に延びて形成されている。また、押圧面118の、前記結合軸84と結合軸114との軸線を含む平面と交差する位置には、押圧面88、118の接近限度を規定するストッパ123が設けられている。

【0015】第2部材102の、第1レバー62の本体部76の内側(図9において下側)の端面122と対向する内側(図9において上側)の端面124には、結合部103近傍において本体部76に最も接近する向きに突出した突出部126が形成されている。また、結合軸66には、図示を省略するねじりコイルばねが取り付けられ、その一方のアームが第1レバー62の結合ピン82に、他方のアームが第2レバー64の第1部材100の前記結合ピンにそれぞれ係合させられることにより、第1レバー62と第2レバー64の第1部材100とは、常には押圧面88、118が互いに離間する向きに付勢されている。したがって、ハンドル部材68、70に力が加えられていない非作動時には、第1レバー62の本体部76の端面122と第2レバー64の突出部126とが当接し、ハンドル部材68、70が離間させられた状態で安定している。このねじりコイルばねの付

勢力に抗してハンドル部材68、70に力が加えられて互いに接近する向きに移動させられれば、第2部材102の突出部126と、第1レバー62の本体部76の端面122の突出部126に対向する部分との係合部が支点となって第2部材102の先端部が第1レバー62から遠ざかる向きに回転させられる。その結果、第1部材100が結合軸104のまわりに回転し、第1部材100の先端部が第1レバー62に接近する。第1部材100の先端部が第1レバー62に接近することにより、押圧板72の押圧面88と押圧板74の押圧面118とが接近させられる。

【0016】押圧板74の押圧面118には、複数個(本実施形態の場合6個)の位置決め突起130、131、132、133、134、135が幅方向に一列に並んで突設されている。位置決め突起130~135は、部品保持テープ10およびテープ連結部材40の送り孔32、44より僅かに小径で、押圧板72の押圧面88に向かって突出している。位置決め突起130、135は、押圧板72から両側方に外れた2箇所にそれぞれ設けられている。本実施形態の場合、位置決め突起131と132との間隔、および位置決め突起133と134との間隔はそれぞれ送り孔32、44と等ピッチとされているが、位置決め突起132、133間は送り孔32、44のピッチの2倍の間隔とされている。また、位置決め突起130、131間および位置決め突起134、135間も、送り孔32のピッチの2倍の間隔とされている。なお、位置決め突起130~135の各ピッチは、送り孔32、44のピッチの整数倍の値から適宜選択可能である。

【0017】図14に拡大して示すように、押圧板72の押圧面88の、位置決め突起131~134に対応する位置には、これら位置決め突起131~134を収容するための凹部136~139(本実施形態においては貫通孔)が形成されている。また、押圧面88において凹部137、138の両側に、Y形爪50とJ形爪52との座屈方向を決めるための案内面158、159および案内面160、161がそれぞれ形成されている。案内面158と案内面159とは押圧面88から遠ざかるに従って互いに接近する向きに傾斜した傾斜面とされており、したがって、Y形爪50とJ形爪52とは先端部(上端部53と湾曲部55)が互いに接近する向きに座屈する。案内面158、159はそれぞれ傾斜が緩やかな別の傾斜面162、163と共同して浅いV溝を形成しており、そのV溝の底部が丸められて案内面158、159と傾斜面162、163とが滑らかにつながれている。案内面160、161についても同様であり、これら案内面160、161に対応する緩やかな傾斜面164、165が形成されている。

【0018】押圧面118の、位置決め突起130、135よりさらに外側方の2箇所には、テープ押さえ部材

140, 142がそれぞれ取り付けられている。テープ押さえ部材140, 142は、図12および図13に示すように、帯状の板がへろ字形に曲げられて押さえ部144と操作部146とが形成されるとともに、湾曲部に円筒状のボス部材148が固定されたものであり、それぞれ結合軸150およびブラケット152により押圧板74に取り付けられている。各ブラケット152は、一対の側板154を備え、上記ボス部材148に挿通された結合軸150の両端部が一対の側板154に支持されるとともに、ブラケット152が押圧板74にスポット溶接等適宜の固定手段により固定されることにより、テープ押さえ部材140, 142が押圧板74に相対回転可能に取り付けられているのである。各結合軸150にはばね部材としてのねじりコイルばね156が取り付けられ、このねじりコイルばね156によりテープ押さえ部材140, 142が付勢されることにより、それらの押さえ部144が押圧板74の押圧面118に弾性的に押し付けられている。操作部146を押圧板74に向かって押し下げ操作すれば、押さえ部144をねじりコイルばね156の付勢力に抗して押圧面118から離間させることができる。

【0019】上記のように構成されたテープ連結工具60による2本の部品保持テープ10の連結について説明する。テープ連結工具60は、常には第1, 第2レバー62, 64の押圧板72と74、ハンドル部材68, 70が互いに離間した状態にある。この状態で、押圧面118の位置決め突起132, 133がテープ連結部材40の3つの送り孔44のうちの両端の2つに挿入されることにより、テープ連結部材40が押圧面118に位置決めされる。この時テープ連結部材40の両端に設けられたY形爪50は、位置決め突起131と132との中間および位置決め突起133と134との中間にそれぞれ位置している。その後、テープ押さえ部材140の操作部146の押下げ操作により押さえ部144が押圧面118から離間させられた状態で、現在SOパッケージ12を供給している部品保持テープ10の終端部37の送り孔32に位置決め突起130~132が挿入され、操作部146の押下げ解除により押さえ部144により終端部37が押さえられる。次に、テープ押さえ部材142の押さえ部144が押圧面11から離間させられた状態で、次にSOパッケージ12を供給する部品保持テープ10の始端部38の送り孔32に位置決め突起133~135が挿入され、押さえ部144により始端部38が押さえられる。このようにテープ連結部材40と部品保持テープ10とが押圧面118上に位置決めされた状態では、図11に示すように、テープ連結部材40の一方の端の送り孔44と部品保持テープ10の終端部37の送り孔32とが一致し、テープ連結部材40の他方の端の送り孔44と部品保持テープ10の始端部38の送り孔32とが一致し、2本の部品保持テープ10のそ

れぞれの端に形成されたほぼ半分の送り孔32がテープ連結部材40の中央の送り孔44に一致する状態となる。また、各部品保持テープ10の上記完全な送り孔32と半分の送り孔32との中間位置にそれぞれJ形爪52が位置し、各部品保持テープ10の完全な送り孔32同士の間位置にY形爪50が位置する状態となってセットが完了する。

【0020】次に、作業者がハンドル部材68, 70を握って互いに接近する方向に移動させれば、第2レバー64が第1部材100と第2部材102との相対回転によりほぼ真っ直ぐな状態に復帰し、押圧板74が押圧板72に接近させられる。この押圧板74と押圧板72との接近により、部品保持テープ10の表面29側が押圧面88により、テープ連結部材40が押圧面118によりそれぞれ押圧され、Y形爪50の上端部53とJ形爪52の湾曲部55とが部品保持テープ10を厚さ方向に貫通して表面29側から突出させられ、案内面158~161に当接させられる。この状態でさらに押圧板72, 74が接近させられることにより、Y形爪50の上端部53およびJ形爪52の湾曲部55が案内面158~161に案内されて互いに接近する方向に座屈させられる。さらに押圧板72, 74が接近させられれば、Y形爪50の上端部53およびJ形爪52の湾曲部55は傾斜面162~165によって曲げられ、完全に押しつぶされる。この際の上端部53および湾曲部55の案内面158~161から傾斜面162~165への移行は、V溝底部の丸みにより円滑に行われる。この押しつぶし時に、Y形爪50は、上端部53の二股に分かれた部分が案内面158, 161および傾斜面162, 165によりさらに押し開かれる方向の成分を含む方向に押しつぶされ、J形爪52は、案内面159, 160および傾斜面163, 164により湾曲部55が幅方向の成分を含む方向に押しつぶされる。テープ連結部材40の本体部42が部品保持テープ10の裏面30に密着した状態になった時点では、Y形爪50およびJ形爪52の、部品保持テープ10の表面29側へ突出した部分がすべて完全に押しつぶされた状態となり、テープ連結部材40の抜け出しが防止されて、2本の部品保持テープ10同士が強固に連結される。この時、押圧面118に設けられた位置決め突起131~134の先端部が部品保持テープ10の表面29から突出するが、この突出部は押圧面88に形成された凹部136~139に收容されるため、押圧板72, 74同士の接近を妨げることがない。また、押圧面88, 118の接近限度がストッパ123により規定されるため、部品保持テープ10やY形爪50, J形爪52等が過剰に押しつぶされることがない。

【0021】このようにして2本の部品保持テープ10が連結された後、ハンドル部材68, 70が解放されれば、テープ連結工具60は前記ねじりコイルばねの付勢

13

力により第1部材100の先端部が第1レバー62から離間し、押圧面88、118同士が離間した状態に復帰させられる。その状態でテープ押さえ部材140、142の押さえ部144が押圧面118から離間させられれば、連結された2本の部品保持テープ10のテープ連結工具60からの取り外しが可能となる。

【0022】部品保持テープ10が紙テープである場合には、上記のように、Y形爪50、J形爪52のほぼ上端部53、湾曲部55のみが部品保持テープ10を貫通し、かしめられる。Y形爪50、J形爪52の部品保持テープ10の表面29から突出する長さが短く、通常であれば座屈させられにくいのであるが、上端部53および湾曲部55はそれぞれ、Y形爪50、J形爪52の他の部分より幅が狭く、かつ、幅方向に傾斜して形成されているため、容易にかつ幅方向の成分を持った方向に押しつぶされ、部品保持テープ10からの離脱が良好に防止される。現在SOパッケージ12を供給している部品保持テープ10の終端部37と、次にSOパッケージ12を供給する部品保持テープ10の始端部38とが確実に連結されるのである。

【0023】それに対し、連結されるべき部品保持テープがエンボステープである場合には、連結されるべき部分の厚さが紙テープに比較して薄いため、Y形爪50およびJ形爪52は、上端部53および湾曲部55のみならず、基端部に近い部分まで部品保持テープを貫通する。そして、これら長く突出した部分がかしめられるのであるが、押圧面88、118の接近限度がストッパ123により規定されるため、Y形爪50およびJ形爪52は突出部全体が部品保持テープの表面に密着するまで完全にはかしめられず、中間部は部品保持テープの表面から僅かに浮き上がった状態となる。しかし、上端部53および湾曲部55は部品保持テープの表面に密着し、本体部42と共同して部品保持テープの連結されるべき部分を両側から挟む状態となるため、エンボステープの始端部と終端部とも確実に連結される。もし、ストッパ123を有しないテープ連結工具によりY形爪50、J形爪52を完全にかしめてエンボステープを連結すれば、エンボステープが過剰に押しつぶされて幅方向に広がってしまうのであるが、そのような不都合な事態の発生がストッパ123により良好に防止されるのである。なお、エンボステープの連結を行う場合には、前記押圧板74の切欠121の形成された部分にエンボス部が受容されることにより、エンボス部を損傷することなくテープの側縁部同士を良好に連結することができる。

【0024】以上の説明から明らかなように、本実施形態における結合軸104が第1結合軸、結合軸66が第2結合軸をそれぞれ構成している。また、第2レバー64の第2部材102に形成された突出部126と第1レバー62の本体部76の側面122の突出部126に対応する部分とが一对の支点形成部を構成し、第1レバー

14

62、第2レバー64、結合軸66、104および上記支点形成部が押圧機構を構成している。

【0025】本実施形態におけるテープ連結部材40およびテープ連結工具60によれば、紙テープ同士の連結だけでなく、エンボステープ同士の連結をも行うことができ、厚さの異なる種々の部品保持テープに適用することもできる。

【0026】また、本実施形態においては、Y形爪50とJ形爪52とが互いに接近する方向につぶされるとともに、Y形爪50の上端部53やJ形爪52の湾曲部55のつぶされる方向が幅方向にほぼ均等に分かれるため、爪の押しつぶしに伴ってテープ連結部材40と部品保持テープ10との間にずれが生じることが良好に防止されるとともに、両爪50、52の部品保持テープ10からの離脱が良好に防止されて十分な結合強度が得られる。また、Y形爪50の上端部53やJ形爪52の湾曲部55が、各爪の基端部よりも幅が狭くされているため、これらが部品保持テープ10を貫通する際、部品保持テープ10に過大な穴が形成されることがない。二股の上端部53や湾曲部55が各爪の基端部より側方に突出している場合には、それらが通過することにより形成された穴に基端部が嵌入しても側方に隙間が生じ、移動が許容されて、部品保持テープ10とテープ連結部材40との相対位置決め精度が不十分となり、結局、2本の部品保持テープ10相互の相対位置決め精度が不十分となる可能性があるのであるが、本実施形態においては十分な相対位置決め精度が得られるのである。また、Y形爪50の上端部53やJ形爪52の湾曲部55が、各爪の基端部よりも幅が狭くされていることにより、これら上端部53や湾曲部55の押しつぶしが容易となり、両爪50、52が基端部において座屈してしまい、連結不良が発生することも良好に防止される。

【0027】さらに、第2レバー64の第2部材102において、支点形成部として機能する突出部126から結合軸104までの距離に比較して、突出部126から後端部（ハンドル部材70）までの距離が大きくされているため、比較的小さな力でテープ連結部材40を強固にかしめることができる。ただし、第1、第2レバーの構成は本実施形態のものに限定されるわけではなく、例えば、通常の工具におけるように、両レバーを交差させ、その交差部において結合軸により相対回転可能に結合することも可能である。

【0028】前記実施形態におけるテープ連結部材40においては、長手方向の両端部にY形爪50が設けられ、その間にJ形爪52が長手方向に隔たって設けられていたが、Y形爪およびJ形爪の配置、さらにかしめ爪の形状等については適宜選択可能である。また、テープ連結部材40は、本体部42が部品保持テープ10の裏面30において密着させられ、表面29側から突出したかしめ爪46がかしめられていたが、本体部42を表

面29に密着させてかしめ爪46を裏面30側からかしめる形態とすることも可能である。

【0029】前記実施形態においては、部品保持テープの連結毎に1個のテープ連結部材40をテープ連結工具60に装着していたが、この連結作業を連続的に行うことを可能とすることも可能である。例えば、ステープラにおけるように、上記実施形態のテープ連結部材40と同様の構成のテープ連結部材を複数個幅方向に連結したものを予めテープ連結工具内に装填しておき、順次1個ずつ送り出して切り離し、連結位置まで移動させて部品保持テープを連結する形態とすることも可能である。なお、この場合には、テープ連結部材の移動を円滑に行うために、テープ連結部材の両端部に形成されたかしめ爪の少なくとも一方を、テープ連結部材の側端に沿って延び出させて、そのかしめ爪の外側の側面をガイドとして使用することが望ましい。その他、特許請求の範囲を逸脱することなく、当業者の知識に基づいて種々の変更、改良を施した形態で本発明を実施することができる。

【図面の簡単な説明】

【図1】本発明の一実施形態であるテープ連結方法によって連結される部品保持テープを示す平面図である。

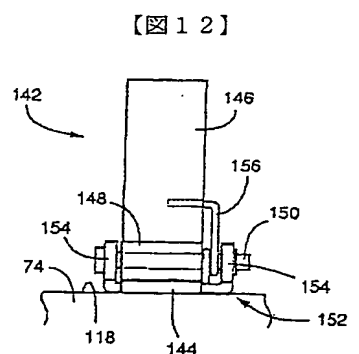
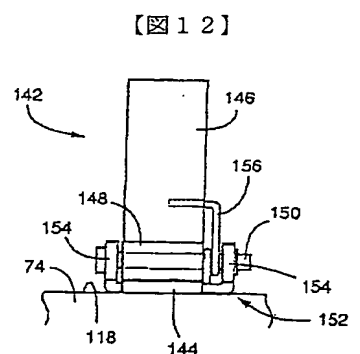
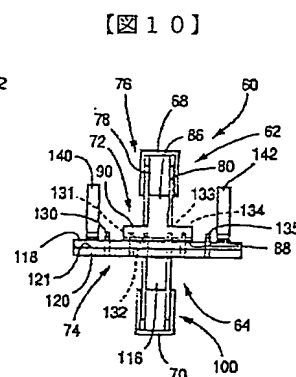
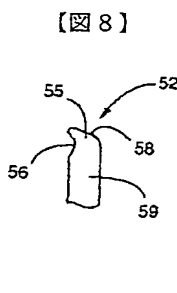
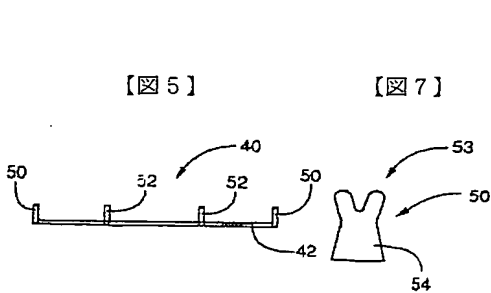
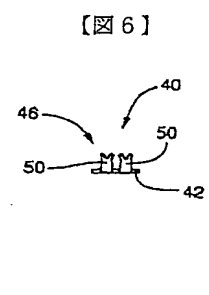
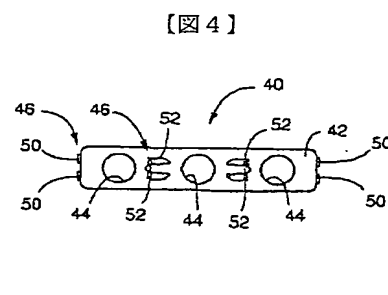
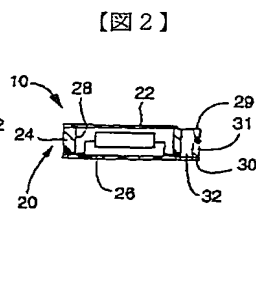
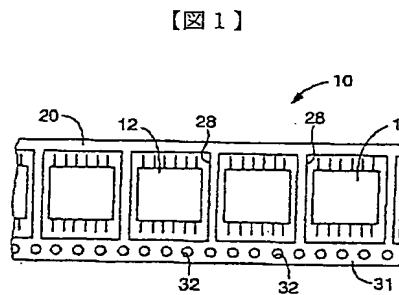
【図2】上記部品保持テープの側面断面図である。

【図3】上記部品保持テープを収容し、送る部品供給装置を概略的に示す図である。

【図4】本発明の一実施形態であるテープ連結部材を示す平面図である。

【図5】上記テープ連結部材の正面図である。

【図6】上記テープ連結部材の側面図である。



【図7】上記テープ連結部材のかしめ爪を拡大して示す図である。

【図8】上記テープ連結部材の別のかしめ爪を拡大して示す図である。

【図9】本発明の一実施形態であるテープ連結工具を示す側面図である。

【図10】上記テープ連結工具の正面図である。

【図11】上記テープ連結部材と部品保持テープとが上記テープ連結工具に位置決めされた状態を示す側面断面図である。

【図12】上記テープ連結工具のテープ押さえ部材を示す正面図である。

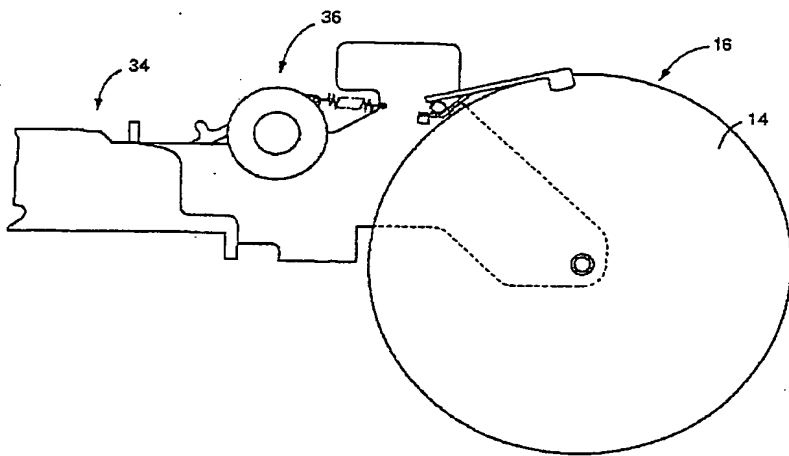
【図13】上記テープ押さえ部材の右側面図である。

【図14】上記テープ連結工具の押圧板を示す正面図である。

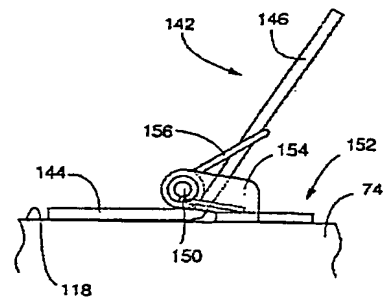
【符号の説明】

- | | | |
|--------------|------------------|------------|
| 10 : 部品保持テープ | 12 : SOパッケージ | 2 |
| 8 : 部品収容凹部 | 32 : 送り孔 | 37 : 終端部 |
| 38 : 始端部 | 40 : テープ連結部材 | 42 : 本体部 |
| 44 : 送り孔 | 46 : かしめ爪 | 50 : Y形爪 |
| 52 : J形爪 | 60 : テープ連結工具 | 6 |
| 2 : 第1レバー | 64 : 第2レバー | |
| 66 : 結合軸 | 72, 74 : 押圧板 | 88, 11 |
| 8 : 押圧面 | 100 : 第1部材 | 102 : 第2部材 |
| 104 : 結合軸 | 122, 124 : 側面 | |
| 126 : 突出部 | 130~135 : 位置決め突起 | |
| 136~139 : 凹部 | | |

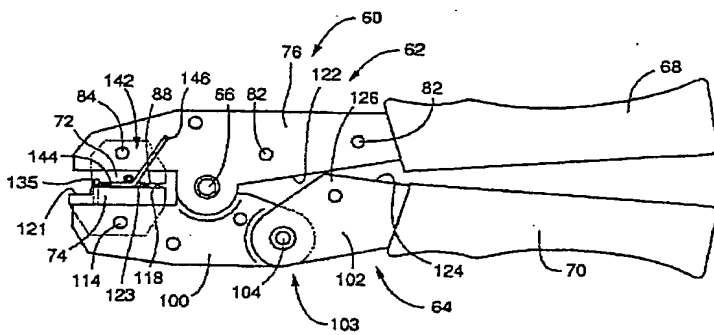
【図 3】



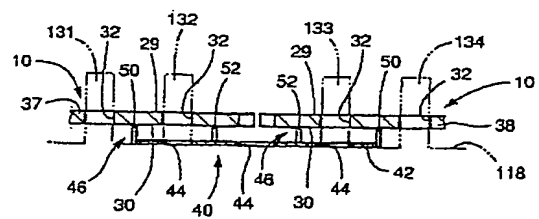
【図 13】



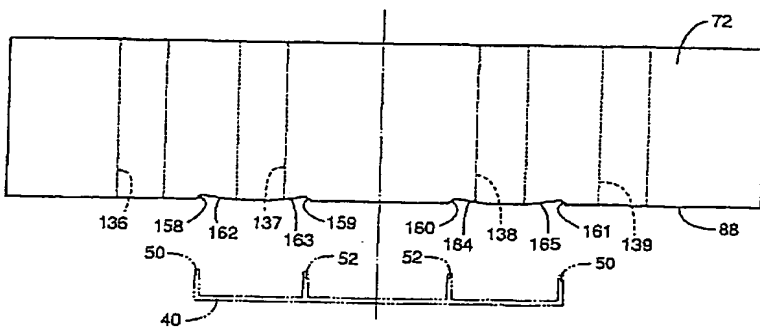
【図 9】



【図 11】



【図 14】



フロントページの続き

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